

(b) a protein encoded by the nucleotide sequence of SEQ ID NO: 3; and

(c) a protein having a hydrophobic cluster analysis (HCA) score with the iota-carrageenase of *Alteromonas fortis* which is greater than or equal to 65% over the domain extending between amino acids 164 and 311 of the amino acid sequence of *Alteromonas fortis* that is SEQ ID NO: 2.

13. (New) A protein according to claim 12, wherein the HCA score is greater than or equal to 70%.

14. (New) A protein according to claim 12, wherein the HCA score is greater than or equal to 75%.

15. (New) A protein according to Claim 12, comprising an amino acid sequence depicted in SEQ ID NO: 2, wherein the protein is extracted from *Alteromonas fortis*.

16. (New) A protein according to Claim 12, comprising an amino acid sequence depicted in SEQ ID NO: 4, wherein the protein is extracted from *Cytophaga drobachiensis*.

17. (New) A method of producing iota-oligocarrageenans, comprising

(a) genetically modifying a host cell with a nucleic acid molecule having SEQ ID NO: 1 or SEQ ID NO: 3, or with a vector comprising a nucleic acid molecule having SEQ ID NO: 1 or SEQ ID NO: 3;

(b) culturing the host cell until a protein having glycosyl hydrolase activity is produced;

(c) isolating the protein having glycosyl hydrolase activity;

(d) contacting the isolated protein having glycosyl hydrolase activity with a carrageenan until iota-oligocarrageenans are produced, and